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Taxonomic studies of *Endophragmiella* from southern China

Li-Guo Ma, Jian Ma, Yi-Dong Zhang & Xiu-Guo Zhang*

Department of Plant Pathology, Shandong Agricultural University, Taian, 271018, China
*Correspondence to: *zhxg@sdau.edu.cn, sdau613@163.com*

Abstract — Two new species, *Endophragmiella clausenae* from dead branches of *Clausena lansium* and *E. pentaphylacis* from dead branches of *Pentaphylax euryoides*, are described and illustrated. *Endophragmiella corticola* is a new record for China. These three species were collected from tropical and subtropical forests in southern China.

Key words — hyphomycetes, taxonomy

Introduction

Sutton (1973) established *Endophragmiella* B. Sutton to accommodate two species, *E. pallescens* B. Sutton and *E. canadensis* (Ellis & Everh.) B. Sutton. The genus is characterized by macronematous, branched or unbranched conidiophores with terminal, integrated, percurrently proliferating and monoblastic conidiogenous cells producing solitary and euseptate or distoseptate conidia with rhexolytic secession (Sutton 1973, Ellis 1976, Hughes 1979, Wu & Zhuang 2005). These characters separate *Endophragmiella* from similar genera, *Phragmocephala* E.W. Mason & S. Hughes, *Chaetendophragmia* Matsush., and *Melanocephala* S. Hughes. Of the 80 species now assigned to *Endophragmiella*, most are saprobes, occurring on rotten wood, dead branches, and decaying leaves (Wu & Zhuang 2005).

Fungal diversity in southern China is high, and many wood-inhabiting fungi have been discovered (Dai et al. 2009, Dai and Li 2010, Ma et al. 2011). In our study on conidial fungi on dead wood from the tropical and subtropical forests in southeast China, two hitherto undescribed species and a new record of *Endophragmiella* were collected. The specimens are deposited in HSAUP (Herbarium of the Department of Plant Pathology, Shandong Agricultural University) and HMAS (Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences).

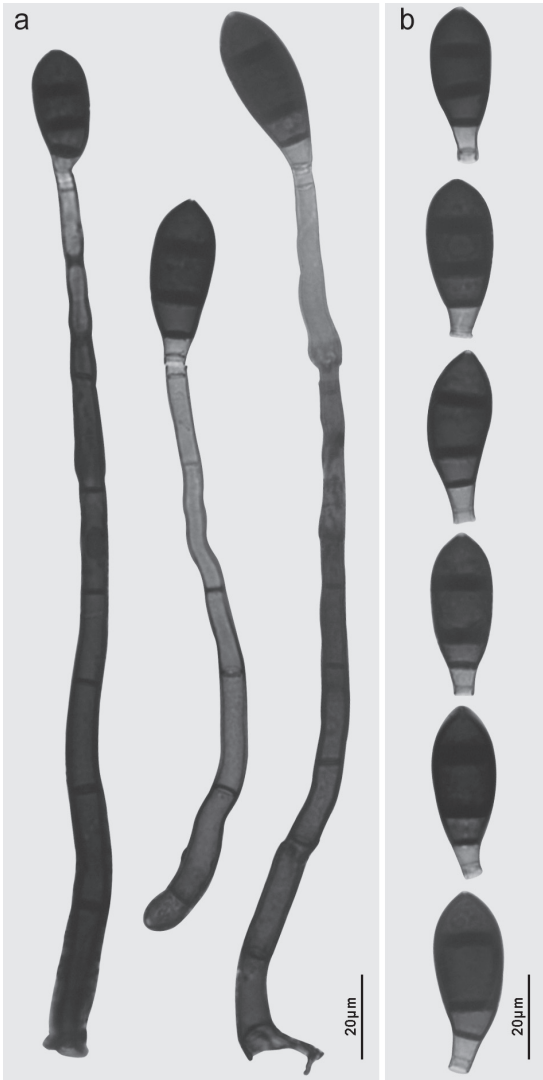

Fig. 1. *Endophragmiella clausenae*. a. Conidiophores and conidia. b. Conidia.

Taxonomy

Endophragmiella clausenae L.G. Ma & X.G. Zhang, **sp. nov.** Fig. 1

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Coloniae effusae, brunneae. Mycelium partim immersum, partim superficiale ex hyphis septatis, ramosis, laevibus, pallide brunneis, 2–4 µm latis, compositum. Conidiophora

solitaria, macronemata, mononemata, recta vel flexuosa, erecta, simplicia, multiseptata, laevia, brunnea, 135–410 × 4.5–8.5 µm. Cellulae conidiogenae *monoblasticae, terminals, in conidiophoris incorporatae, cum proliferationibus percurrentes, cylindricae, laeviae, pallide brunneae. Secessio conidiorum rhexolytica.* Conidia *solitaria, acrogena, 3-euseptata, ellipsoidea, clavata vel pyriformia, simplicia, sicca, laevia, brunnea vel atrobrunnea, cellula basalis 4.5–6 µm crassa, pallide brunneis, 31.5–42.5 ×14–16.5µm.*

Type: China, Yunnan Province: the Forbidden Forest of Banna, on dead branches of *Clausena lansium* (Lour.) Skeels (*Rutaceae*), 17 Oct. 2008, L.G. Ma (**holotype** HSAUP H0074; isotype HMAS 146108).

Etymology: in reference to the host genus, *Clausena*.

Colonies on the natural substrate effuse, brown. Mycelium partly immersed, partly superficial, composed of septate, branched, smooth-walled, pale brown hyphae, 2–4 µm thick. Conidiophores solitary, macronematous, mononematous, straight or flexuous, erect, simple, multiseptate, smooth, brown, 135–410 × 4.5–8.5 µm. Conidiogenous cells monoblastic, terminal, integrated, with conspicuous percurrent proliferations, cylindrical, smooth, pale brown. Conidial secession rhexolytic. Conidia solitary, acrogenous, 3-euseptate, ellipsoid, clavate to pyriform, simple, dry, smooth, brown to dark brown, basal cells 4.5–6 µm wide, pale brown, 31.5–42.5 × 14–16.5 µm.

Endophragmiella clausenae is similar to *E. bisbyi* (Hughes 1978a) and *E. mexicana* (Mercado et al. 1995) in conidial shape. *Endophragmiella bisbyi* differs from the new species by its smaller (9–13 × 5–6.5 µm) conidia with the thick distal septum and brown distal cell, while *E. mexicana* is easily distinguished by its much smaller (11–16 × 5.8–7.8 µm) predominantly 4-septate conidia with paler distal and basal cells.

Endophragmiella pentaphylacis L.G. Ma & X.G. Zhang, **sp. nov.** Fig. 2

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Coloniae effusae, brunneae. Mycelium partim immersum, partim superficiale ex hyphis septatis, ramosis, laevibus, subhyalinis vel pallide brunneis, compositum. Conidiophora *solitaria, macronemata, mononemata, recta, erecta, simplicia, septata, laevia, pallide brunnea vel brunnea, 56–92 × 4.5–7.5 µm.* Cellulae conidiogenae *monoblasticae, terminals, in conidiophoris incorporatae, cum proliferationibus percurrentes, cylindricae, laeviae, pallide brunneae. Secessio conidiorum rhexolytica.* Conidia *solitaria, acrogena, 3-septata, late ellipsoidea vel pyriformia, simplicia, sicca, laevia, brunnea vel atrobrunnea, cellula basalis 2.5–5 µm crassa, pallide brunneis, 25–32.5 × 13–16.5µm.*

Type: China, Yunnan Province: the Forbidden Forest of Banna, on dead branches of *Pentaphylax euryoides* Gardner & Champ. (*Pentaphylaceae*), 18 Oct. 2008, L.G. Ma (**holotype** HSAUP H0042; isotype HMAS 146109).

Etymology: in reference to the host genus, *Pentaphylax*.

Colonies on the natural substrate effuse, brown. Mycelium partly immersed, partly superficial, composed of septate, branched, smooth-walled, subhyaline to pale brown hyphae. Conidiophores solitary, macronematous,

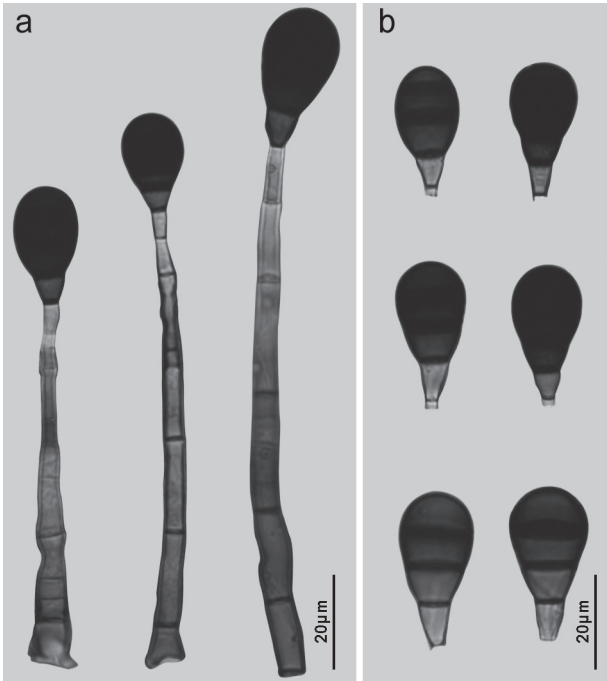

Fig. 2. *Endophragmiella pentaphylacis*. a. Conidiophores and conidia. b. Conidia.

mononematous, straight, erect, simple, septate, smooth, pale brown to brown, 56–92 × 4.5–7.5 µm. Conidiogenous cells monoblastic, terminal, integrated, with conspicuous percurrent proliferations, cylindrical, smooth, pale brown. Conidial secession rhexolytic. Conidia solitary, acrogenous, 3-septate, broadly ellipsoid to pyriform, simple, dry, smooth, brown to dark brown, basal cells 2.5–5 µm wide, pale brown, 25–32.5 × 13–16.5 µm.

Endophragmiella pentaphylacis resembles *E. bisbyi* (Hughes 1978a), *E. ontariensis* (Hughes 1978b), *E. ellisii* (Hughes 1979), and *E. suttonii* (Kirk 1981) in conidial shape, but it can be differentiated from *E. suttonii*, *E. ontariensis* and *E. ellisii* by its larger, predominantly 3-septate and dark brown to black conidia. *E. bisbyi* can be separated from *E. pentaphylacis*, which has smaller (9–13 × 5–6.5 µm), versicolored conidia.

Endophragmiella corticola P.M. Kirk, Trans. Br. Mycol. Soc. 78(1): 60, 1982. Fig. 3

Colonies on the natural substrate pale brown to brown, effuse. Mycelium mostly superficial composed of branched, septate, subhyaline to pale brown, smooth-walled hyphae, 1.5–3 µm thick. Conidiophores macronematous,

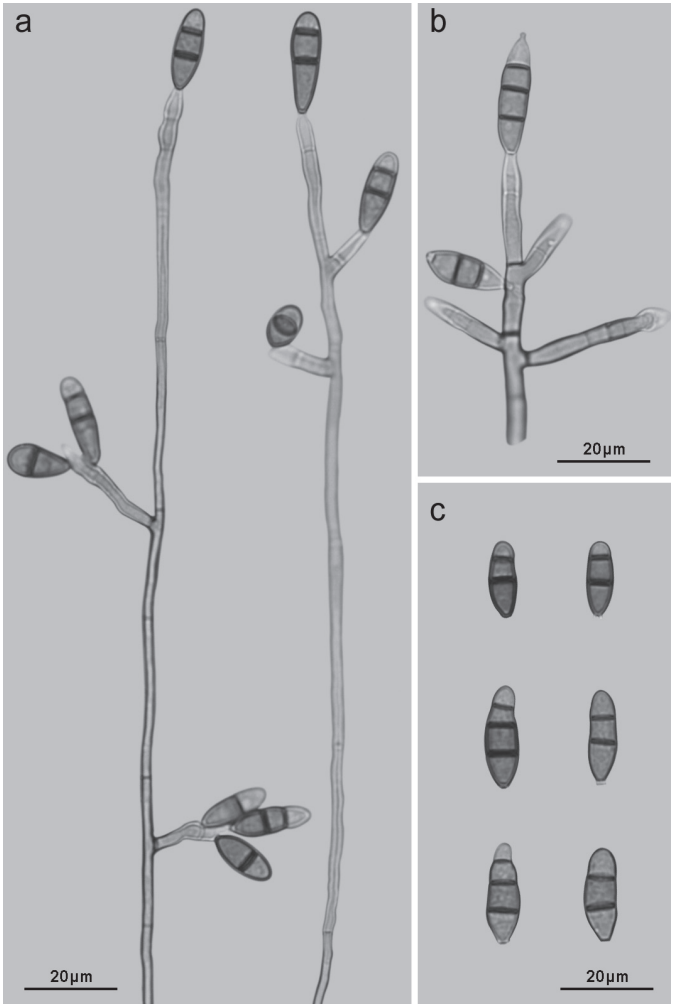

Fig. 3. *Endophragmiella corticola*. a–b. Branched conidiophores and conidia. c. Conidia.

mononematous, arising terminally and laterally from the mycelium, straight or flexuous, erect, branched, septate, smooth, pale brown, up to 350 μm high, 2.5–4 μm wide. Conidiogenous cells monoblastic, terminal, integrated, percurrent, cylindrical, tapered to a truncate apex, smooth, subhyaline. Conidial secession rhexolytic. Conidia solitary, acrogenous, 2–3-septate, narrowly obclavate to obclavate, simple, smooth, basal cells 1.5–3 μm wide, pale brown to brown, apical cells subhyaline, 16.5–25 × 5.5–7.5 μm.

Specimens examined: China, Fujian Province: the National Forest Park of Wuyishan, on dead branches of *Ficus gibbosa* Blume (*Moraceae*), 14 Aug. 2009, L.G. Ma, HSAUP H1026 (duplicate HMAS 146110).

Endophragmiella corticola is similar to *E. eboracensis* (Sutton 1975), *E. acuta* (Wu & Zhuang 2005), *E. verticillata* (Hughes 1978c), *E. curvata* (Hughes 1979), and *E. cesatii* (Hughes 1979). Ellipsoidal, shorter, 3-septate conidia and verticillately branched conidiophores distinguish *E. verticillata*, while *E. eboracensis* can be separated by its much shorter and mainly 3-septate conidia. *Endophragmiella acuta* has wider, 3-septate conidia with a tapered and rostrate apex and occasionally branched conidiophores; *E. curvata* has predominantly 2-septate conidia and unbranched conidiophores; and *E. cesatii* has wider, predominantly 3-septate conidia with brown central cells and unbranched conidiophores. The type material differs from the Chinese specimen in generally longer (14–42 µm) conidia and shorter (< 60 µm) conidiophores. This is the first record from China.

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